

**PEDIATRIC INTENSIVE CARE (PICU) ROTATION  
Clinical Base Year**

**Collaborating Faculty:**

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I. DURATION: one month

II. FACILITIES/RESOURCES:

Pediatric Intensive Care Unit, WVU Children's Hospital

III. GENERAL GOALS AND OBJECTIVES:

Residents on the PICU rotation will gain exposure to the evaluation and management of critically ill infants, children, and adolescents. The house officer should become familiar with:

- a. How to evaluate and manage common signs and symptoms of critical illness and how to recognize when to transfer a patient to an ICU setting.
- b. How to manage common diagnoses in the PICU setting to include: shock, drowning, common intoxications, MODS, congestive heart failure, severe dehydration, DKA, SIADH, GI bleeding, DIC, sepsis, meningitis, head trauma, status epilepticus, respiratory failure, ARDS, status asthmaticus, pneumothorax, and airway obstruction.
- c. How to select and interpret laboratory and imaging studies in the PICU.
- d. The application of physiologic monitoring equipment in the PICU.
- e. The use of special technology and treatments to include: devices to supply supplemental oxygen, positive pressure ventilation, vasoactive drugs, analgesics, sedatives, and paralytics.
- f. The management of complex acutely ill patients, including how to rapidly assess and address primary problems and when to consult for additional help.
- g. How to communicate with patients and families stressed by the severe illness of their child, including observation of discussions regarding the expected prognosis of the patient and decisions on the continuance of life support.

IV. COMPETENCY-BASED GOALS AND OBJECTIVES:

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**1. MEDICAL KNOWLEDGE:** Demonstrate competence in the diagnosis and management of pediatric disorders requiring intensive care.

**GOAL: Common Conditions.** Manage certain common diagnoses (reasonably expected of general pediatricians) in the PICU setting.

### OBJECTIVES:

For each of the following diagnoses which may require PICU monitoring and management:

- a. Discuss the pathophysiologic basis of the disease or injury.
- b. Discuss indications for admission to and discharge from the PICU.
- c. Discuss stabilization, further work-up and management.
- d. Explain potential acute and long-term consequences and complication of the disease and treatment, and be able to evaluate prognosis.

### **List of Common Conditions**

1. **General:** Submersion injury, shock (cardiogenic, hypovolemic, septic, toxic), burns (thermal, electrical), common intoxications
2. **Cardiovascular:** Congestive heart failure [if large cardiac surgery service, also pericardial effusion, cardiac tamponade]
3. **Fluids, electrolytes, metabolic:** Severe dehydration, diabetic ketoacidosis, syndrome of inappropriate secretion of antidiuretic hormone (SIADH), diabetes insipidus
4. **GI/Surgery:** Stress ulcer, massive GI bleeding, abdominal trauma (blunt/penetrating), acute abdomen, pre-op and post-op management
5. **Hematologic:** Disseminated intravascular coagulopathy (DIC)
6. **Infectious disease:** Sepsis, meningitis, encephalitis
7. **Neurologic:** Head injury, acute increased intracranial pressure, cerebral edema, status epilepticus
8. **Pulmonary:** Adult respiratory distress syndrome (ARDS), respiratory failure/impending respiratory failure, status asthmaticus, pneumothorax, upper airway obstruction (infectious, structural, foreign body)

**GOAL: Diagnostic Testing.** Use and interpret laboratory and imaging studies in the PICU as can be reasonably expected of general pediatricians.

### OBJECTIVES:

Explain the indications and limitations and be aware of age-appropriate normals for the laboratory or diagnostic tests in the lists below:

### **List of Laboratory Tests**

1. CBC, differential, platelets, indices
2. Blood chemistries: electrolytes, calcium, magnesium, glucose
3. Tests of liver function and damage

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4. Renal function tests
5. Arterial blood gases
6. Coagulation studies: platelets, PT/PTT, fibrinogen, FSP, D-dimers, "DIC screen"
7. Urinalysis
8. CSF analysis
9. Cultures and other diagnostic tests for infectious agents
10. Drug levels and toxicologic studies

**List of Imaging Studies**

11. Chest x-ray
12. Abdominal series
13. Skeletal survey
14. Cervical spine films
15. CT scans

GOAL: Monitoring and Therapeutic Modalities. Apply of physiologic monitoring and special technology and treatment in the PICU setting.

OBJECTIVE:

For each of these invasive techniques, describe the indications and general technique and appropriately interpret the results of such monitoring (not necessarily perform the procedure):

1. CVP
2. PAP
3. PCWP
4. Intracranial monitoring

GOAL: Medical Ethics and Legal Issues. Demonstrate familiarity with ethical and medical-legal considerations in the care of critically ill children.

OBJECTIVES:

- a. Discuss concepts of futility, withdrawal, and withholding of care.
- b. Define brain death and describe criteria for organ donation.

**2. PATIENT CARE:** Demonstrate competence in admission and assumption of the primary care of patients hospitalized in the pediatric intensive care.

GOAL: Resuscitation and Stabilization. Demonstrate resuscitation and stabilization of the critically ill child in the PICU setting.

OBJECTIVES:

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- a. Explain and perform steps in resuscitation and stabilization, particularly airway management and resuscitative pharmacology.
- b. Describe the common causes of acute deterioration in the previously stable PICU patient.
- c. Function appropriately in codes and resuscitations as part of the PICU team.

GOAL: Common Signs and Symptoms. Evaluate and manage common signs and symptoms seen in critically ill children, including when to transfer to an intensive care setting.

### OBJECTIVES:

For each of the following signs and symptoms which may herald the onset of serious or life threatening events in infants, children, or adolescents:

- a. Rapidly recognize the sign or symptom as heralding the onset of disease or injury and perform a directed pertinent history and physical examination.
- b. Formulate an age-appropriate differential diagnosis.
- c. Discuss indications for admission to and discharge from the PICU, and indications for emergent intervention, as well as procedures for stabilization prior to transport to the PICU.
- d. Devise a plan for stabilization, further evaluation, and definitive management, and be able to describe the physiologic basis for therapies.

### **List of Signs and Symptoms**

1. **Cardiovascular:** Bradycardia, tachycardia, cardiopulmonary arrest, hypertension, hypotension, rhythm disturbances, poor capillary perfusion
2. **GI:** Abdominal distension, acute gastrointestinal hemorrhage, peritoneal signs, vomiting
3. **Hematologic:** Petechiae, purpura, polycythemia, anemia, neutropenia, thrombocytopenia
4. **Neurologic:** Altered mental status, coma, delirium, encephalopathy, seizures, thermoregulatory abnormalities, acute weakness, tetany
5. **Renal:** Anuria, hematuria, oliguria, polyuria
6. **Respiratory:** Tachypnea, dyspnea, apnea, cyanosis, increased or decreased respiratory effort, poor air movement, stridor, wheezing, pulmonary edema

GOAL: Diagnostic Testing. Use and interpret laboratory and imaging studies in the PICU as can be reasonably expected of general pediatricians.

### OBJECTIVES:

For the laboratory or diagnostic tests in the lists below:

- a. Interpret abnormalities in the context of specific physiologic derangement.
- b. Discuss therapeutic options for corrections when appropriate.

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### List of Laboratory Tests

1. CBC, differential, platelets, indices
2. Blood chemistries: electrolytes, calcium, magnesium, glucose
3. Tests of liver function and damage
4. Renal function tests
5. Arterial blood gases
6. Coagulation studies: platelets, PT/PTT, fibrinogen, FSP, D-dimers, "DIC screen"
7. Urinalysis
8. CSF analysis
9. Cultures and other diagnostic tests for infectious agents
10. Drug levels and toxicologic studies

### List of Imaging Studies (PICU)

11. Chest x-ray
12. Abdominal series
13. Skeletal survey
14. Cervical spine films
15. CT scans

GOAL: Monitoring and Therapeutic Modalities. Apply physiologic monitoring and special technology and treatment in the PICU setting.

### OBJECTIVES:

For the common therapies listed, integrate understanding of physiology and pathophysiology to determine the appropriate use of therapy and how to monitor its effect; and describe potential complications of therapy:

1. Oxygen administration by cannula, masks, hood
2. Positive pressure ventilation
3. Basic ventilator management
4. Analgesics, sedatives, and paralytics
5. Enteral and parenteral nutrition
6. Blood and blood product transfusions
7. Vasoactive drugs (pressors and inotropes)

GOAL: Management and Decision-Making. Develop case management skills for complex multiproblem patients under high stress situations, under the supervision of an intensivist, using principles of decision-making and problem solving and understanding one's own limits.

### OBJECTIVES:

- a. Coordinate with multiple consultants involved in the care of the patient.

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- b. Coordinate orderly transfer of care to another provider when PICU care is no longer needed.

GOAL: Patient Support and Advocacy. Provide comprehensive and supportive care to the PICU patient and his family.

### OBJECTIVES:

- a. Recognize and evaluate the psychosocial needs of acutely ill children and their families, both during the immediate illness and during recovery.
- b. Identify problems and risk factors in the child and family, even outside the scope of this ICU admission; appropriately intervene or refer (e.g., injury prevention; importance of anticipatory guidance in teaching parents about the early signs and symptoms of serious, life-threatening disease).

**3. INTERPERSONAL SKILLS AND COMMUNICATION:** Demonstrate effective communication skills with patients and families. Demonstrate effective and collegial communication skills with physicians, consultants and nurses. Maintain comprehensive and concise written histories and physicals as well as daily notes on patients on the service.

GOAL: Management and Decision-Making. Develop case management skills for complex multiproblem patients under high stress situations, under the supervision of an intensivist, using principles of decision-making and problem solving and understanding one's own limits.

### OBJECTIVES:

- a. Develop and maintain a detailed problem list with accurate prioritization.
- b. Coordinate with multiple consultants involved in the care of the patient.
- c. Coordinate orderly transfer of care to another provider when PICU care is no longer needed.

GOAL: Teamwork and Consultation. Function effectively as a team member in the PICU.

### OBJECTIVES:

- a. Communicate well and work effectively with fellow residents, attendings, consultants, nurses, ancillary staff, and referring physicians.
- b. Assist referring physicians in preparing a patient for transport to the PICU.
- c. Provide pediatric consultation to surgeons and other specialists who manage children in the PICU.

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GOAL: Patient Support and Advocacy. Provide comprehensive and supportive care to the PICU patient and his family.

OBJECTIVE:

Communicate well with children and families.

GOAL: Medical Records. Maintain accurate, timely and legally appropriate medical records on complex and critically ill children.

OBJECTIVES:

- a. Maintain daily, timed notes, with updates as necessary, clearly documenting the patient's progress and details of the ongoing evaluation and plan.
- b. Prepare appropriate and timely discharge and transfer notes.

**4. PROFESSIONALISM:** Demonstrate a commitment to patient care and learning by timeliness, responsibility for patients and sensitivity to cultural diversity. Demonstrate adherence to ethical principles.

GOAL: Management and Decision-Making. Develop case management skills for complex multiproblem patients under high stress situations, under the supervision of an intensivist, using principles of decision-making and problem solving and understanding one's own limits.

OBJECTIVE:

Consistently act responsibly and adhere to professional standards for ethical and legal behavior.

GOAL: Patient Support and Advocacy. Provide comprehensive and supportive care to the PICU patient and his family.

OBJECTIVE:

Demonstrate respect, sensitivity, and skill in dealing with death and dying with the child, the family, and other health care professionals.

**5. PRACTICE-BASED LEARNING AND IMPROVEMENT:** Demonstrates the ability to use medical literature to effectively and cogently evaluate patient care practices

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and modify management plans appropriately based on the information. Demonstrates receptiveness to feedback provided during the rotation with appropriate modification of behavior to improve performance.

GOAL: Management and Decision-Making. Develop case management skills for complex multiproblem patients under high stress situations, under the supervision of an intensivist, using principles of decision-making and problem solving and understanding one's own limits.

### OBJECTIVE:

Recognize the limits of one's knowledge, skills, and tolerance for stress level; ask for help as needed.

**6. SYSTEMS-BASED PRACTICE:** Demonstrate understanding of cost issues related to intensive care hospital stays, participate in the multidisciplinary discharge planning conferences and formulate an appropriate plan for progress to inpatient service and subsequent outpatient care.

GOAL: Medical Ethics and Legal Issues. Become familiar with ethical and medical-legal considerations in the care of critically ill children.

### OBJECTIVES:

Demonstrate understanding of hospital policy on "Do Not Resuscitate" orders.

GOAL: Financial Issues and Cost Control. Understand key aspects of cost control in the PICU.

### OBJECTIVES:

- a. Demonstrate awareness of costs of PICU care and its impact on families; refer families for social services support as needed.
- b. Use consultants and resources appropriate

## **RESIDENT RESPONSIBILITIES:**

- a. The house officer will be responsible for following all patients admitted to the PICU, both medical and surgical, as well as pediatric patients in the CICU, MICU, or SICU. The PICU nursing staff recognizes the pediatric resident as the first physician to contact with any questions regarding patient care.
- b. Inform the ICU attending regarding all new admissions.

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- c. The house officer will examine the patients at least daily, present the patient to the staff attending, and document the agreed upon management plan in a daily progress note.
- d. Overnight call will be taken approximately six times per month, during which time the resident will cover the PICU patients and may be responsible for the pediatric ward patients and emergency department consults.
- e. The resident will evaluate patients in the ED, ward, or pediatric clinic who are recommended for ICU admission. In cases where urgent intervention is required, this evaluation will occur under the guidance of the PICU attending.
- f. The resident will also communicate with the air-evacuation system regarding transport of patients to and from the TAMC PICU.
- g. The house officer will be a primary responder to all pediatric codes that occur while he/she is in house.
- h. Check Transport box weekly and assure that it is adequately stocked.
- i. The resident will speak with and update the patients family daily as well as update primary care provider regarding patient's status and discharge plan as needed.

### **INSTRUCTIONAL PLAN:**

- a. Lectures on critical care topics addressing the objectives previously discussed will be presented to the resident at least two to three times per week.
- b. Separate reading Curriculum for second and third year residents will be made available for completion during the rotation.
- c. The resident will examine one topic in depth by preparing and delivering an inservice to the nursing staff. Senior residents will have the option to do an evidence based review of a suitable topic.
- d. A monthly Mock Code exercise will allow the resident experience in running a resuscitation scenario.

### **METHODS OF EVALUATION:**

1. Monthly summative evaluations will be written and discussed with the resident prior to the end of the rotation. Evaluation tools will include:
  - a. Performance during didactic sessions and rounds with attending (Medical Knowledge and Patient Care)
  - b. Nursing evaluation and Patient Satisfaction Survey (Interpersonal Skills and Professionalism)
  - c. Presentation skills during morning report and on rounds (Communication)
  - d. Patient care and procedural skills are assessed by attending (Patient Care)
  - e. Mock code (Simulated Patient Care)
  - f. Evidence of self-evaluation and use of medical literature (Practice-Based Learning)
  - g. Input from supervised and supervisory resident(s) (Peer evaluation)

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2. Resident evaluation will be documented on Pediatric Department Monthly Evaluation Forms.
3. A written post evaluation will be given (Medical knowledge)

## **Curriculum Timeline**

Approved by Education Committee September 19, 2007